

Daily GLOWBUGS

Digest: V1 #100

via AB4EL Web Digests @ SunSITE

Purpose: building and operating vacuum tube-based QRP rigs

[AB4EL Ham Radio Homepage @ SunSITE](#)

%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%%

Subject: glowbugs V1 #100

glowbugs

Saturday, August 30 1997

Volume 01 : Number 100

Date: Thu, 28 Aug 1997 21:18:02 -0700 (PDT)

From: John Kolb <jlkolb@cts.com>

Subject: Re: 12V "space charge" tubes (was Re: Secret origins)

On Thu, 28 Aug 1997, Ben Wallace wrote:

> The R-392 receiver used low voltage tubes. The R-392 receiver is powered
> by 24-28 vdc and uses low voltage B+ tubes exclusively. Interesting.

Well the R-392 does use 24-28 V for the plate supply (and is said to have much better intermod performance if the filaments are run on 24-26 VDC, while the plates are run from a higher voltage, 28-30VDC.

I can't find the 26A6, the most common tube in the receiver, in a tube manual, but there are four 12AU7's in the set running on 28V, and I wouldn't call them low plate voltage tubes.

This discussion of space charge tubes does make me think of putting some in a ARR-41 to make it run on 12Vdc, instead of 110 VAC.

John Kolb KK6IL jlkolb@cts.com

Date: Fri, 29 Aug 1997 08:50:10 -0600

From: Dexter Francis <cwest@xmission.com>

Subject: Re: 12V "space charge" tubes (was Re: Secret origins)

John Kolb write:

"I can't find the 26A6, the most common tube in the receiver, in a tube manual, but there are four 12AU7's in the set running on 28V, and I wouldn't call them low plate voltage tubes."

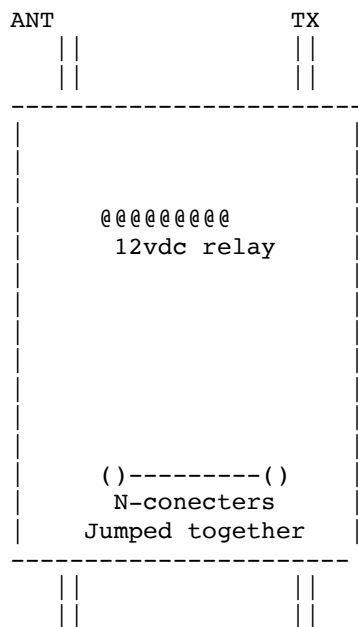
The 6B4G ran up to to 250 Volts on the plate with a grid bias of -45. Plate resistance was only 800 ohms, gm was 5250, amplification factor was 4.2, load was 2500 ohms in class A.

- -----Visit our Web site at-----
http://www.xmission.com/~cwest/
or e-mail to: tubes@usa.net

Hello everyone!

The relay is a Tohtsu cx-800n
12vdc 250ma

Here is a ruf example of the relay.



f. RFD INPUT

Ok. as I understand it the
ANT= will go to the amplifier's input
TX= ???
f.RFD ???
INPUT = rf from the transceiver.

The f.RFD and the TX cas me a bit confused.

Is the f.RFD to get a neg key line for the transceiver?

And the TX has me doumbfounded!

Help!!!!!!!!!!

Thanks.
Dave Booth kc6wfs dm04
booth@pactitle.com

Date: Fri, 29 Aug 1997 09:01:26 -0600
From: Dexter Francis <cwest@xmission.com>
Subject: Re: More on 6A3 -> 6B4G -> 2A3

Further digging revealed that the 6B4-G's characteristics are the same
as the veberable old 2A3.

There is a full set of 2A3 curves in my RC-18 handbook and it shows that
at a plate voltage of 25 and the grid at 0 the plate current should be
about 15 ma.

- -----Visit our Web site at-----
 <http://www.xmission.com/~cwest/>
 or e-mail to: tubes@usa.net

Date: Fri, 29 Aug 97 09:26:02 PDT
From: "Phoenix Crystals" <phxtal@nava-link.net>
Subject: Fw: 80 METER CRYSTAL GROUP BUY!

- --MimeMultipartBoundary
Content-Type: text/plain; charset="ISO-8859-1"; X-MAPIextension=".TXT"
Content-Transfer-Encoding: 7bit

Hi gang,
There's been so many late comer's trying to get order's in at the last
minute, and since I'm going to be out of town for three day's, I've decided
to extend the crystal offer's for another week or so.
This should give everyone a chance to get in on the offer if they want any
of the group's. So just send me an e-mail, and then forward a copy of the
order and a personal check to the C-W Crystals address.
Thank all of you for you support, and orders.

73 John
John Morris
C-W CRYSTALS (Formerly Phoenix Crystals)
1714 NORTH ASH ST.
NEVADA, MO 64772

Phone: (417) 667-6179
FAX: (417) 667-6169
E-mail: phxtal@nava-link.net

Supplying custom crystals for Vintage Equipment, QRP'ers, Amateurs, and
Experimenters since 1933.

- -----

Subject: 80 METER CRYSTAL GROUP BUY!

>
> Hi Gang,
> After considerable message's attempting to pick a group of frequencies to
> offer here's the deal:
>
> Group #1: 5 Each 80 EXTRA: 3505, 3510, 3515, 3520, 3525 Khz. for \$29.00
> Postpaid CONUS
> Group #2: 5 Each 80 GEN. : 3550, 3555, 3560, 3565, 3570 Khz. for \$29.00
> Postpaid CONUS
> Group #3: 5 Each 80 GEN. : 3530, 3535, 3540, 3545, 3550 Khz. for \$29.00
> Postpaid CONUS
> Group #4: 7 Ea. 80 GEN. : 3530, 3535, 3540, 3545, 3550, 3555, 3560
> Khz. for \$40.60 Postpaid CONUS
> Group #5: 5 Each 80 NOV. : 3700, 3705, 3710, 3715, 3720 Khz. for \$29.00
> Postpaid CONUS
> Group #6: 5 Each 80 NOV. : 3680, 3685, 3690, 3695, 3700 Khz. for \$29.00
> Postpaid CONUS
> Group #7: 7 Ea. 80 NOV. : 3680, 3685, 3690, 3695, 3700, 3705, 3710
> Khz. for \$40.60 Postpaid CONUS
> If anyone want's the 3880, 3885 AM Freq. crystals added to one of the
> above
> groups, add an additional \$5.80 for each crystal desired.
>
> I've tried to include something for every Class of operator as I did with
> the "40 Meter Group Buy" offers.
>
>
> ORDER DEADLINE: Offer expires AUGUST 31, 1997
>
> John Morris
> C-W CRYSTALS (Formerly Phoenix Crystals)
> 1714 NORTH ASH ST.
> NEVADA, MO 64772
>
> Supplying custom crystals for Vintage Equipment, QRP'ers, Amateurs, and
> Experimenters since 1933.

- --MimeMultipartBoundary--

Date: Fri, 29 Aug 1997 09:25:05 -0700 (MST)
From: Jeff Duntemann <jeffd@coriolis.com>
Subject: Space charge tubes--the sequel

Lady and gentlemen---

Here is a list of 12V "space charge" tubes. You can do a lot with only a couple different types: 12EK6 RF amp, 12AD6 converter, 12K5 "power" audio amp. I've heard many types are identical and they sub well. This group comes out of the 1963 RCA tube handbook. There may be a few others out there from other manufacturers, but by 1963 this category had peaked and the list contains most of what you're likely to find.

12AC6 rem cutoff pentode
12AD6 pentagrid conv
12AE6 duo diode medium mu triode
12AE7 dual triode
12AF6 rem cutoff pentode
12AJ6 duo diode hi mu triode
12AL8 med mu triode power tetrode
12BL6 rem cutoff pentode
12CN5 rem cutoff pentode
12CX6 rem cutoff pentode
12DE8 diode rem cutoff pentode
12DK7 duo diode power tetrode
12DL8 duo diode power tetrode (diodes have own cathode)
12DS7 duo diode power tetrode
12DU7 duo diode power tetrode
12DV8 duo diode power tetrode (diodes have own cathode)
12DY8 med mu triode rem cutoff tetrode
12DZ6 rem cutoff pentode (curves are in 1963 RCA tube handbook)
12EA6 rem cutoff pentode
12EC8 med mu triode semiremote cutoff pentode (semiremote?)
12EG6 pentagrid amplifier (no idea what this is)
12EK6 rem cutoff pentode
12EL6 duo diode hi mu triode
12EM6 diode power tetrode
12F8 duo diode rem cutoff pentode
12FK6 duo diode lo mu triode (triode curves are in 1963 RCA tube handbook)
12FM6 duo diode med mu triode
12FX8 med mu triode pentagrid conv
12GA6 pentagrid conv
12J8 duo diode power tetrode
12K5 power tetrode
12U7 twin med mu triode

The 12EK6, 12DZ6 and 12AE6 are listed as direct subs in the RCA manual.

My article files for space charge tubes yield the pieces below. Several of these were graciously sent to me by Michael Covington N4TMI, who retrieved them from the dusty stacks at the University of Georgia, Athens.

"Low Plate potential Tubes" RADIO & TELEVISION NEWS, January 1957. Some theory and history from Tung-Sol, including curves on the 12K5.

"Simple 12V Mobile Converter for 75 & 40 Meters" QST, July 1958, Hints & Kinks. Proves out NA4G's contention that "ordinary" tubes work at 12V by showing a 12SA7 metal converter in 12V service with a 3MC crystal.

"Converter Puts FM in Your Car" RADIO-ELECTRONICS, August 1959. Basically a one-page review of the Gonset 3311 broadcast FM converter product. It includes a schematic, which is useful for biasing values and ideas, but coil and some cap values are not given. Uses 12EC8, 12EZ6, 12AD6, and 12AL5.

"Design of Mobile Receivers with Low Plate Potential Tubes" ELECTRONICS, August 19, 1960. Useful circuits for the 12EK6 amp and 12AD6 converter, for FM mobile to 180Mhz.

"A 10-Meter Mobile Converter" CQ, August 1963. Uses a 12AD6. No crystal; uses LC tuning. You could lash this up in an hour and it would be fun to try if you have local 10M AM activity.

"A Complete Mobile Package, Part 2" QST, July 1964. Best of the lot. 5-band switched RF amp, converter, and 1600kc IF strip for use into a car radio. Basically the front end for a bandswitched superhet using space charge tubes. Uses our friends the 12EK6 and 12AD6. Part 1 of this series is a nice AM rig with a 2E26 final.

"An Inexpensive Mobile Converter" CQ, issue unknown. I copied this out of my mags for filing without taking note of the issue, but I would guess 60-62 somewhere. Simple circuit with a 12BE6 asnd a 3Mc crystal, converts to 40 and 80. As usual, for car radios. Says 12AD6 will work as well.

Several car radio schematics using space charge tubes are present in a book by Lou Garner called TRANSIUSTOR CIRCUIT HANDBOOK, published by Coyne Electrical School (Chicago) in 1960. However, if you have any of the old Photofacts books for car radios in the period 1957-1964 you'll probably find a bunch of examples. There is also a car radio schematic in back of the 1963 RCA tube handbook. It's also in the 1965 book and may be in others but those are the only two I have.

Those are all the space charge tube circuits in my files, but I'd love to hear of more. Anybody got any?

I haven't done anything really ambitious with this stuff. I've lashed up an audio amp that worked well, and a 12AD6 direct conversion receiver circuit that didn't work as well, but I didn't put a lot of time into improving it. I built the IF amp portion of the car radio in the RCA handbook (as well as the SS audio amp) and it works very well; that will eventually become an 80 meter superhet when I get around to building the front end. I made a Pierce oscillator with one half of a 12U7 and it worked well at 7 Mc. I'd guess a "micropower" rig could be made with one 12AL8, and that would be fun for QRPPppppppp.

These tubes are very cheap, even at AES, probably because they're not widely used in popular vintage gear. They are also available from Alltronics in San Jose. I'd like to see more done with them, particularly in terms of circuits that kids can put together, since the high voltage issue isn't present. As always I'm interested in hearing what others have done here. Also, I'd be curious to know what a "pentagrid amplifier" is for, and what "semiremote" means.

- --73--

- --Jeff Duntemann KG7JF
Scottsdale, Arizona

Ok. I got it all figured out now! Yippi!!!!

Dave Booth kc6wfs dm04

```

>
>
>
>
>
> ANT                                TX
>      ||                             ||
>      ||                             ||
>-----
> |                                     |
> |                                     |
> |          @@@@@@@@@@               |
> |         12vdc relay                |
> |                                     |
> |                                     |
> |          ()-----()              |
> |         N-conectors                 |
> |        Jumped together              |
> |                                     |
>-----
>      ||                             ||
>      ||                             ||
> f. RFD                               INPUT

```

```
> Ok. as I understand it the
> ANT= will go to the amplifier's input
> TX= ???
```

> f.RFD ???
> INPUT = rf from the transceiver.
>
> The f.RFD and the TX cas me a bit confused.
>
> Is the f.RFD to get a neg key line for the transceiver?
>
> And the TX has me doumbfounded!
>
> Help!!!!!!!!!!
>
>
> Thanks.
> Dave Booth kc6wfs dm04
> booth@pactitle.com
>

Date: Fri, 29 Aug 1997 18:35:55 -0400 (EDT)
From: leeboo@ct.net (Leon Wiltsey)
Subject: xtal holders needed

>To:gb
>From: leeboo@ct.net (Leon Wiltsey)
>Subject: xtal holders needed
>Cc:
>Bcc:
>X-Attachments:
>
>Hi gang really need a few garden variety chassis mount (the kind with a
hole in the middle
>for a screw) xtal holders. Got some new xtals Cant seem to find any in my
elect. cats
> thru net and now the socket for them on the hw 16 is busted. I think these
are ft247 xtals
>the square postage stamp size type not the ones with rounded corners that
are smaller.
>pse email me if u have any to spare.
>
THANK THE LORD FOR ALL YOU HAVE

68 yr old semidisabled senior
(stroke got my balance & hand to eye coordination)
ham agn as KF4RCL TECK+ (MUCH HAPPINESS)
BUILD MOST STATION EQUIP
SUB.BA & GB-- NO SOLID STATE

LEON B WILTSEY (Lee) tel. 941 471 3739
4600 Lake Haven BLVD.
Sebring, Fl. 33872 (SEBRING) WHERE THERE IS NO QRM FROM THE LOCALS

Date: Fri, 29 Aug 1997 15:40:15 -0600
From: Doug <doug@sunrise.alpinet.net>

Subject: An Introduction

I see lots of intros on the list, so perhaps my turn has come. Normally, I prefer to stay in the background unless there's an overwhelming need to leave the shadows where I lurk. So...this is sort of an "opening" for me.

My name is Doug Dunn, I live near Livingston, MT, about 60 miles North of Yellowstone Park. I've spent most of my life involved in some way or another with Ham Radio, always attempting to feed the "interest" inside that this Hobby has become for me. I've been lucky though, with only one two year period where I could do no radio accomplishments while overseas during the SE Asia conflict.

I started in the late fiftys with an old Handbook, given me by a friend along with several apple boxes of goodies and parts. This was the beginning of a lifelong relationship with communications that eventually directed me into a career in the telephone racket, as a microwave and Toll tech, with excursions into big power plants, towers, antennas and diesel engines. I was fortunate to complete 30 years in '95 and took the retirement that was offered to senior techs that year.

My first rig was the wooden chassis 6V6 on 40 meters, with appropriate harmonics on 20 and 15, built before I got my novice in '62. So....along with an ARC5 rcvr for 40, when the ticket came in the mail...I was off and running. After some curious gremlins and help from a couple patient OTS who lived in the area, I graduated to an ARC5 transmitter, modified for a 6AG7 crystal oscillator to meet the specs in those days. I lived for the late evenings where I could get on the key and meet new friends on the rig.....great fun.

So....it's been a long road to here, but truly an enjoyable one. I've spent most of the time in between building some sort of "Glowbug" projects....many of which were big RF Amps....4-1000A's and the like, with a few old triode units along the way. I now work 30 meters as often as possible and build a project every so often, especially in the Winter when snowballs are flying and it's too cold outside to do anything. It's a great time to feed the fire and burn some solder on the

bench. I use a pair of R390A's for day and nighttime monitoring, with the volume set just low enough to let me sleep but can wake me up if something of importance pops up.

Most of my operating is on CW, and it's become a second language for me, using an old Vibroplex....even used it mobile this summer from my pickup...fun. I tried a keyer years ago and never got the hang of it. I've got several bugs of different vintage, with one from the mid 20's that still works well, although its seen better days. At one time, I could use both Landline and International Morse well, but the LL has drifted into the dusty files of time. I occasionally slip up and grab the wrong character out the brain, but think the International is firmly locked in now.

So...that's all about me....hope to meet some glowbuggers on the air. I really enjoy the older CW rigs, and hearing them is like a warm blanket in the Wintertime.

73

Doug, K7YD

Date: Fri, 29 Aug 1997 22:53:09 -0700 (PDT)
From: John Kolb <jlkolb@cts.com>
Subject: Re: 12V "space charge" tubes (was Re: Secret origins)

On Fri, 29 Aug 1997, Dexter Francis wrote:

> John Kolb write:

>

> "I can't find the 26A6, the most common tube in the receiver,
> in a tube manual, but there are four 12AU7's in the set running
> on 28V, and I wouldn't call them low plate voltage tubes."

>

> The 26A6 is just the 26 volt filament version of the 6A6, which is a Hi
> mu Twin power triode. The characteristics are the same as the 6B4G.

>

Looking in the R-392 schematics, the 26A6 is a pentode, not a twin triode, so grabbel Sibley's "Tube Lore", where the 26A6 is listed as a 6BA6 with 26.5 V heater. Looking at the curves in my RCA RC-22 tube manual, there's not much detail on the low volts, but looks like the curve gets in a very different operating region below +40V or so, than at higher voltages.

John Kolb jlkolb@cts.com KK6IL

End of glowbugs V1 #100

%%%% GlowBugs %%%% GlowBugs %%%% GlowBugs %%%% GlowBugs %%%%

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Created by **Steve Modena, AB4EL**
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